A2

30. (Amended) The system of claim 26 wherein at least one layer is formed from a self-sealing material.

A3

32. (Amended) The system of claim 26, wherein at least one layer is formed from polytetrafluoroethylene.

A4

62. (Amended) The method of claim 51 wherein the electrode assembly is in place when the sample is loaded into the sample-accepting microstructure section in step (b).

A5

69. (Amended) The method of claim 51 wherein the detection in step (e) is by a method selected from the group consisting of fluorometry, colorimetry, luminometry, mass spectrometry, electrochemical detection, and radioactivity detection.

Please add the following new claims:

--78. (New) A microstructure plate comprising:

A6

at least one microstructure, each microstructure comprising a series of microstructure sections and channels, wherein each microstructure section is directly interconnected to at least one other microstructure section by at least one channel, the series comprising:

at least one sample accepting microstructure section, wherein the sample accepting section is fluidly connected to the exterior of the microstructure plate;

at least one first electrode microstructure section;

at least one second electrode microstructure section;

at least one capture microstructure section containing a capture matrix, wherein the capture microstructure section is between the first and second electrode microstructure sections in the series;

A6 cont'd

wherein the microstructures in the microstructure plate are formed by at least two layers of material, wherein at least one layer is a sealing plate layer which seals at least one channel or microstructure section in the assembled microstructure plate.

79. (New) The microstructure plate of claim 78 wherein the sealing plate comprises at least one opening to the exterior of the microstructure plate.

80. (New) The microstructure plate of claim 79 wherein at least one opening of the sealing plate aligns with at least one sample accepting microstructure section.

81. (New) The microstructure plate of claim 79 wherein at least one opening of the sealing plate aligns with at least one electrode microstructure section.

82. (New) The microstructure plate of claim 81 wherein at least one opening in the sealing plate permits extension of at least one electrode towards at least one electrode microstructure section.

83. (New) The microstructure plate of claim 79 wherein at least one opening of the sealing plate aligns with the capture microstructure section.

A4 Cont'd

84. (New) The microstructure plate of claim 78 wherein at least one layer of the microstructure plate other than the sealing plate comprises at least one opening to the exterior of the microstructure plate.

85. (New) The microstructure plate of claim 84 wherein at least one opening of the non-sealing plate layer aligns with at least one sample accepting microstructure section.

86. (New) The microstructure plate of claim 84 wherein at least one opening of the non-sealing plate layer aligns with at least one electrode microstructure section.

87. (New) The microstructure plate of claim 86 wherein at least one opening in the non-sealing plate layer permits extension of at least one electrode towards at least one electrode microstructure section.

88. (New) The microstructure plate of claim 78 wherein the microstructure unit comprises two capture microstructure sections, wherein one capture microstructure section is positioned in the series between the sample accepting microstructure section and the first

electrode microstructure section, and the second capture microstructure section is positioned in the series between the sample accepting microstructure section and the second electrode microstructure section.

89. (New) The microstructure plate of claim 78 wherein at lest one layer of the microstructure plate is transparent to light.

90. (New) The microstructure plate of claim 78 wherein the capture matrix comprises a material having the ability to covalently or non-covalently bind at least one molecule of interest.

91. (New) The microstructure plate of claim 90 wherein the capture matrix is positioned within the capture microstructure section so that the molecule of interest travels across the microstructure tangential to the surface of the capture matrix when an electric field is applied.

92. (New) The microstructure plate of claim 90 wherein the capture matrix is positioned within the capture microstructure section so that the molecule of interest travels through the microstructure orthogonal to the surface of the capture matrix when an electric field is applied.

93. (New) The microstructure plate of claim 90 wherein the capture matrix binds the molecule of interest specifically.

94. (New) The microstructure plate of claim 93 wherein the capture matrix comprises an affinity binding material selected from the group consisting of antibodies, streptavidin and avidin.

A4 Contd.

95. (New) The microstructure plate of claim 90 wherein the capture matrix binds the molecule of interest non-specifically.

96. (New) The microstructure plate of claim 95 wherein the capture matrix comprises a material selected from the group consisting of metal chelate resins, anionic resins, cationic resins, polyvinylidine fluoride, nitrocellulose, and charged nylon.

97. (New) The microstructure plate of claim 78 wherein the capture matrix impedes the movement of a molecule of interest.

98. (New) The microstructure plate of claim 97 wherein the capture matrix comprises a material selected from the group consisting of cellulose, glass fiber, nylon, and hydrogels.

99. (New) The microstructure plate of claim 98 wherein the capture matrix is a

hydrogel selected from the group consisting of agarose, polyacrylamide, aminopropylmethacrylamide, 3-sulfopropyldimethyl-3-methacrylamidopropylammonium inner salt, methacrylic acid, 3-sulfopropylmethacrylate potassium salt, glycerylmonomethacrylate, and derivatives thereof.

A6 Cont'd

100. (New) The microstructure plate of claim 97 wherein the capture matrix is positioned within the capture microstructure section so that the molecule of interest travels through the microstructure orthogonal to the surface of the capture matrix when an electric field is applied.

101. (New) The microstructure plate of claim 78 wherein at least two channels connecting at least three microstructure sections lie in a three-dimensional configuration.

102. (New) The microstructure plate of claim 78 wherein the channels connecting the microstructure sections lie in a substantially planar configuration.

103. (New) The microstructure plate of claim 78 wherein the microstructure plate is comprised of more than two layers of material, the layers comprising a plurality of voids which define the microstructure sections and channels when the layers are aligned.

104. (New) The microstructure plate of claim 103 wherein the voids defining the

channels of the microstructure lie within a single layer.

105. (New) The microstructure plate of claim 103 wherein the voids defining the channels of the microstructure lie within more than one layer.

A4 Cont'd.

106. (New) The microstructure plate of claim 103 wherein the capture matrix is held between two layers in order to position it within the capture microstructure section.

107. (New) The microstructure plate of claim 103 wherein at least one layer is formed from a self-sealing material.

108. (New) The microstructure plate of claim 107 wherein the self-sealing material is polydimethylsiloxane.

109. (New) The microstructure plate of claim 103 wherein at least one layer is formed from polytetrafluoroethylene.

110. (New) The microstructure plate of claim 78 wherein the channels between the microstructure sections of the microstructure have a cross-sectional area between 10,000 and 9,000,000 μm^2.

111. (New) The microstructure plate of claim 78 wherein the channels between the microstructure sections of the microstructure have a cross-sectional area between 10,000 and 250,000 μm^2.

112. (New) The microstructure plate of claim 78 wherein the channels between the microstructure sections of the microstructure have a cross-sectional area between 25,000 and 250,000 μm^2.

113. (New) The microstructure plate of claim 78 wherein the microstructure plate is approximately 8.5 cm by 11 cm.

114. (New) The microstructure plate of claim 113 wherein the microstructure plate comprises a plurality of rectangularly arrayed microstructures.

115. (New) The microstructure plate of claim 113 wherein the microstructure plate comprises 96 rectangularly arrayed microstructures.

116. (New) The microstructure plate of claim 113 wherein the microstructure plate comprises 384 rectangularly arrayed microstructures.

117. (New) The microstructure plate of claim 113 wherein the microstructure plate

comprises 1536 rectangularly arrayed microstructures.

118. (New) A method for separating molecules having different charges using the microstructure plate of claim 78, comprising the steps of:

A4 Cont'd.

(a) filling the microstructure plate with a liquid,

(b) introducing a sample into a sample-accepting microstructure section of the microstructure plate,

(c) contacting said first and second electrode microstructure sections with an electrode assembly having at least one first and one second electrode,

(d) energizing the electrode assembly for a sufficient period of time to allow a charged molecule of interest in the sample to migrate towards an electrode of the electrode assembly and to be caught in said capture matrix, and

(e) detecting the charged molecule of interest caught in the capture matrix.

119. (New) The method of claim 118, further comprising the preparatory step of placing at least one captured matrix in at least one captured microstructure section of said microstructure plate.

120. (New) The method of claim 119 wherein the capture matrix is a hydrogel matrix.

121. (New) The method of claim 120 wherein the hydrogel is polymerized after being

placed in the capture microstructure section, the method further comprising the step of subjecting a hydrogel precursor to UV irradiation after being placed in the capture microstructure section.

A1 Cont'd.

122. (New) The method of claim 118 wherein the capture matrix is a membrane.

123. (New) The method of claim 118 wherein the liquid is an aqueous buffer.

124. (New) The method of claim 123 wherein the aqueous buffer is selected from the group consisting of: Tris hydrochloride buffers, Tris borate buffers, histidine buffer, β-alanine buffers, adipic dihydrazide buffers, and HEPES buffers.

125. (New) The method of claim 123 wherein the microstructure is filled with an aqueous buffer by introducing the buffer into the sample microstructure section under pressure.

126. (New) The method of claim 118 wherein the microstructure is filled with liquid by an automated pipettor.

127. (New) The method of claim 118 wherein the sample is introduced into the sample-accepting microstructure section by an automated sample transfer device, and wherein the sample is transferred from the well of a microtiter plate.

128. (New) The method of claim 118 wherein the electrode assembly is in place when the sample is loaded into the sample-accepting microstructure section in step (b).

A4 Cont'd.

129. (New) The method of claim 118 wherein the electrodes are energized to apply 1μAmp to 10 mAmp of current through the microstructure.

130. (New) The method of claim 118 wherein the electrodes are energized to apply 1μAMP to 5 mAMp of current through the microstructure.

131. (New) The method of claim 118 wherein the electrodes are energized to apply 5μAmp to 1 mAmp of current through the microstructure.

132. (New) The method of claim 118 wherein the electrodes are energized to apply a potential of 0.1 V to 500 V across the microstructure.

133. (New) The method of claim 118 wherein the electrodes are energized to apply a potential of 0.5 V to 100 V across the microstructure.

134. (New) The method of claim 118 wherein the electrodes are energized to apply a potential of 1.0 V to 40 V across the microstructure.

135. (New) The method of claim 118 wherein the detection in step (e) is by a method selected from the group consisting of fluorometry, colorimetry, luminometry, mass spectrometry, electrochemical detection, and radioactivity detection.

A4 Contd.

136. (New) The method of claim 135 wherein the detection in step (e) is by fluorometry.

137. (New) The method of claim 135 wherein the charged molecule of interest is detected by placing at least a portion of the apparatus containing the microstructure plate into a microtiter plate reader.

138. (New) The method of claim 118 wherein the charged molecule of interest is the product of a substrate reaction wherein the net charge of a substrate is changed in the enzymatic reaction.

139. (New) The method of claim 138 wherein the charged molecule of interest and the substrate both comprise a detectable labeling moiety.

140. (New) The method of claim 139 wherein the labeling moiety is a fluorescent moiety.

141. (New) The method of claim 138 wherein the method is capable of detecting the enzymatic conversion of at least 10% of the substrate.

142. (New) The method of claim 138 wherein the method is capable of detecting the enzymatic conversion of at least 1.0.% of the substrate.

A4 cont'd

143. (New) The method of claim 138 wherein the method is capable of detecting the enzymatic conversion of at least 0.1% of the substrate.

144. (New) The method of claim 53 wherein the hydrogel matrix is formed from a hydrogel-forming monomer that is injected through an opening to the exterior of the microstructure plate.

145. (New) The method of claim 144 wherein a photomask is used to specifically UV cure the hydrogel in the capture microstructure sections.

146. (New) The method of claim 120 wherein the hydrogel matrix is formed from a hydrogel-forming monomer that is injected through an opening to the exterior of the microstructure plate.

147. (New) The method of claim 146 wherein a photomask is used to specifically UV cure the hydrogel in the capture microstructure sections.--

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